

CLEAN AMENDED PARAGRAPHS/SECTIONS/CLAIMS

In the Title:

Delete the TITLE OF THE INVENTION section and replace such deleted section with the following replacement TITLE OF THE INVENTION section:

REDUCTION OF INDUCED MAGNETIC FORCES
ON CURRENT COLLECTORS IN HOMOPOLAR
MACHINES HAVING HIGH MAGNETIC FIELDS

In the Specification:

Delete the SUMMARY OF THE INVENTION section beginning on page 4, line 14 and replace such deleted section with the following replacement section:

SUMMARY OF THE INVENTION

The present invention advantageously addresses the needs above as well as other needs by providing a homopolar machine that includes a shaft, an armature assembly, an outer flux return, and a plurality of stator-current collector arrays. The armature assembly is coupled to the shaft and includes a plurality of armature conductor turns. The outer flux return encloses the armature assembly. The plurality of stator-current collector arrays are coupled to the outer flux return and encircle the armature assembly. Each stator-current collector array includes a plurality of current collectors that provide a sliding electrical current interface with the armature conductor turns. Means are provided for maintaining substantially constant contact pressure of the current collectors with the armature conductor turns in the presence of high magnetic fields produced by superconducting field coils.

Another aspect of the present invention provides a homopolar machine that includes a shaft, an armature assembly, an outer flux return, and a plurality of stator-

current collector arrays. The armature assembly is coupled to the shaft and includes a plurality of armature conductor turns. The outer flux return encloses the armature assembly. The plurality of stator-current collector arrays are coupled to the outer flux return and encircle the armature assembly. Each stator-current collector array includes a plurality of current collectors that maintain substantially constant contact pressure with the armature conductor turns in the presence of high magnetic fields to provide a sliding electrical current interface with the armature conductor turns. The outer flux return comprises a geometry that directs magnetic field lines substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns to reduce induced magnetic forces that may deflect the current collectors.

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Another aspect of the present invention provides a method of operating a homopolar machine that includes the steps of: rotating an armature assembly that includes a plurality of armature conductor turns; creating a magnetic field through the armature assembly; providing a plurality of stator-current collector arrays that encircle the armature assembly, each stator-current collector array including a plurality of current collectors which provide a sliding electrical current interface with the armature conductor turns; reducing induced magnetic forces that may deflect the current collectors by directing magnetic field lines substantially parallel to a direction of current flow in a region where the plurality of current collectors contact the armature conductor turns; and maintaining substantially constant contact pressure between the plurality of current collectors and the armature assembly in the presence of the magnetic field.

Another aspect of the present invention provides a method of operating a homopolar machine that includes the steps of: energizing superconducting field coils in the homopolar machine to create a magnetic field through an armature assembly that includes a plurality of armature conductor turns; supplying current to a plurality of current collectors that provide a sliding electrical current interface with the armature conductor turns; and maintaining an orientation of the plurality of current